

# Evaluation of Binding Agents for Base/Subbase Stabilization — a SolidEarth Case Study

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## Introduction

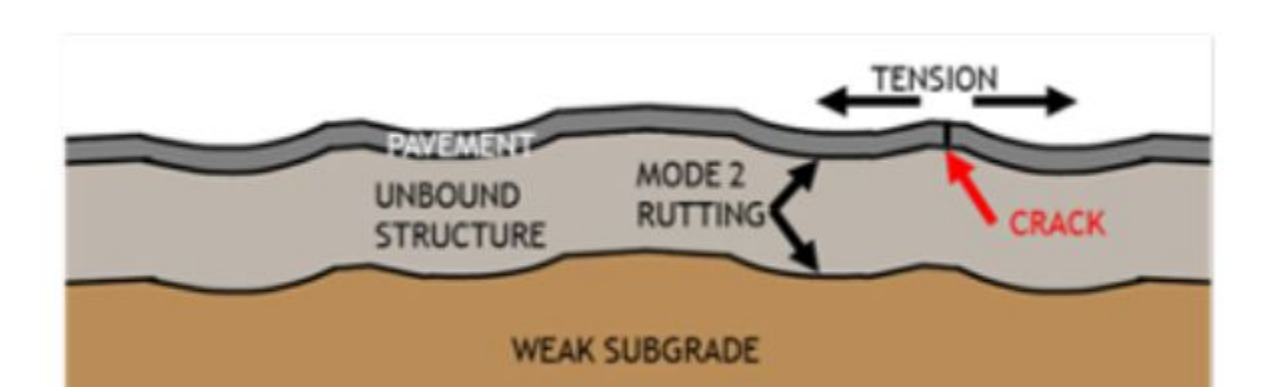
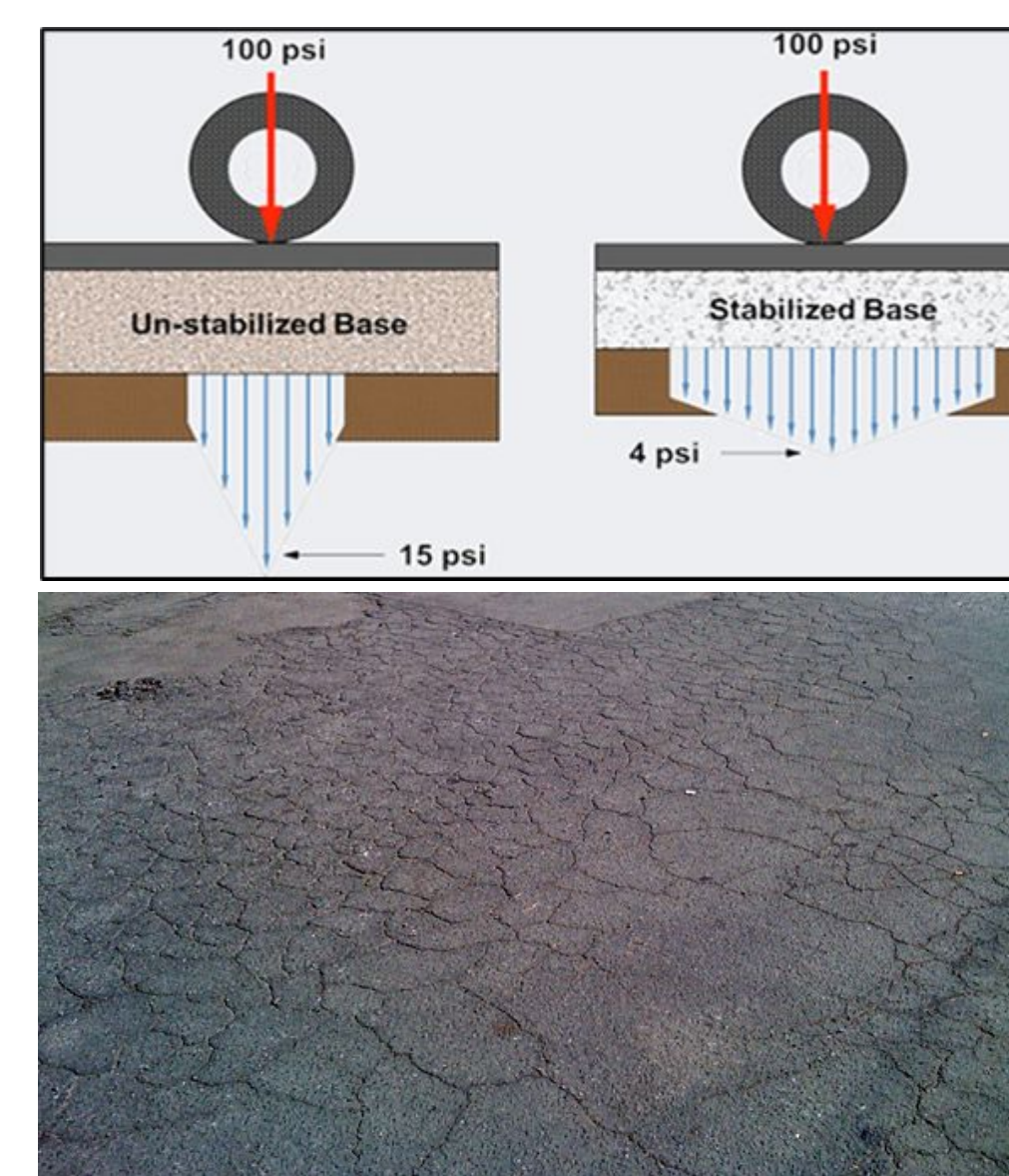
- Many roadway bases and subbases are constructed using local aggregates with limited stiffness and cohesion, leading to rutting and reduced service life
- Traditional stabilizers like cement and lime can effectively improve strength but often result in high carbon emissions, brittleness, and shrinkage cracking.

## Objectives

- Evaluate and compare results of SolidEarth testing with traditional stabilizers results
- Determine if SolidEarth is an effective stabilizer in the base or subbase layers for roadways

## Problem Description

The use of traditional stabilizers for roadways can improve results, but also produce undesirable outcomes. Some examples are below:



Alligator Cracking

Rutting

## Methodology

- Testing: Added diluted mixture of SolidEarth into different soil types and complete several tests



S1 S2 S3 S4 S5

- Tests include: Proctor, Unconfined Compression Strength(UCS), Tensile Strength Ratio(TSR), Durability Resistance and Permeability



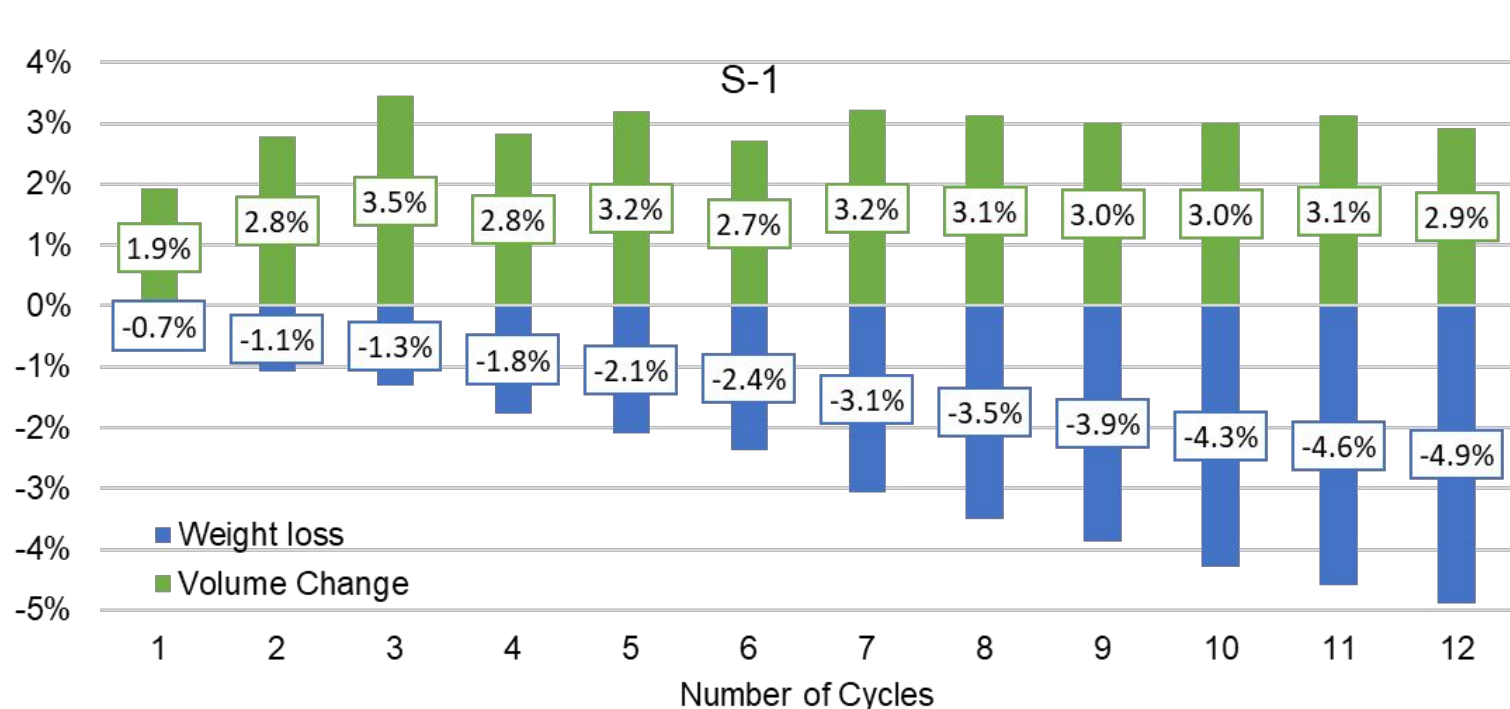
UCS UCS samples TSR Permeability

- Modeling and Analysis: Acquire data from physical methods or machinery and complete analysis of materials in excel

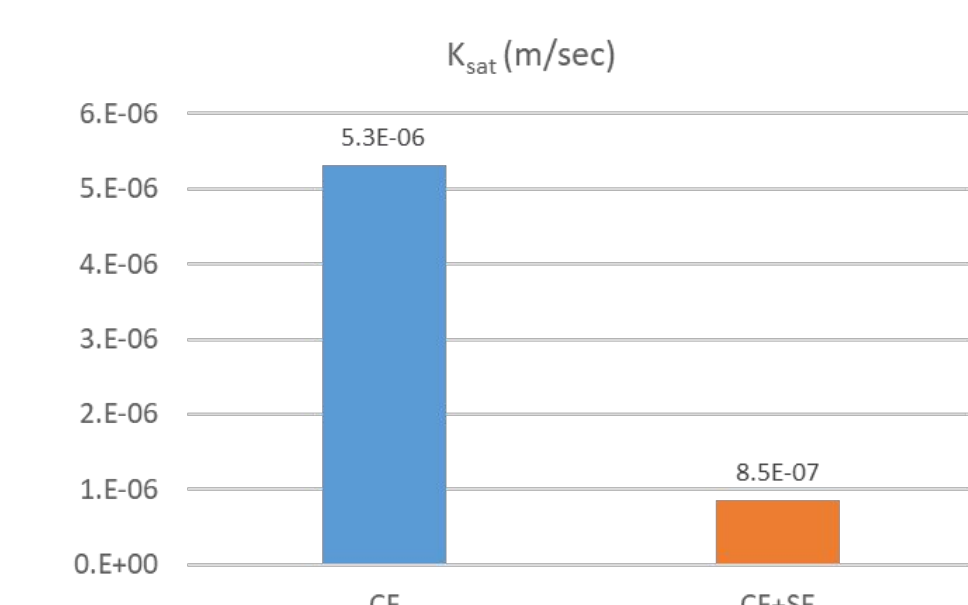
Soil Tested	Oven-Dried UCS (kPa)	Heat Lamp Dried UCS (kPa)
Control	240	1,578
SEi	1,260	2,201

For 6% lime treated soil, UCS ranges from 435 to 635 kPa depending on soil source.

## UCS Results



Durability Results



Permeability Results

## Discussion

Initial testing has been done on several projects already, but none have been tested for base or subbase layers.

- SolidEarth has better soil strength in comparison to lime-treated soils
  - Slow curing, which is more accurate to field conditions, improves strength as well
- SolidEarth has tremendous durability and minimal weight loss over time



More testing should be done:

- CBR, Carbon footprint, Recyclability
- But initial testing shows that SolidEarth would have positive benefits being located in the base/subbase layers of roadways